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Heterogeneous atomic-scale break junctions for spin-based electronics[1] DOGUKAN DENIZ, PATRICK GARTLAND, DRAGOMIR DAVIDOVIC, Georgia Inst of Tech — We discuss properties of atomic-scale contacts formed by breaking a thin film of Au, containing embedded ferromagnetic nanoparticles made from Ni, with diameters ranging from 2-5nm. The contacts are made by using a feedback-based electromigration technique. The breaking process leads to the observation of plateaus in conductance versus time plots, which we attribute to discrete atomic rearrangements. These discrete steps are studied using conductance histograms in order to compare the effects of interspersed nanoparticles in the junctions. Comparisons of Au films and Au-Ni composites lead to significant differences in conductance histograms, indicating that Ni plays a role in the process of breaking. Magneto-resistance measurements of Au-Ni composite contacts are investigated to determine the viability of this fabrication process for nm-scale spin-based electronics.

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